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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,206	05/03/2001	Philip Guy	82402-3801	9235

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Ade & Company
1700 360 Main Street
Winnipeg Manitoba, R3C 3Z3
CANADA

EXAMINER

CHUNDURU, SURYAPRABHA

ART UNIT PAPER NUMBER

1637

DATE MAILED: 06/26/2003

22

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/720,206

Applicant(s)

GUY ET AL.

Examiner

Suryaprabha Chunduru

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Applicants' response to the office action (Paper No. 21) filed on March 31, 2003 has been entered.

Response to Arguments

2. Applicant's response to the office action (Paper No.21) is fully considered and deemed persuasive in part.

3. The rejection of claims 28-38 under 35 U.S.C. 102(e) as being anticipated by Tarczynski et al. (USPN. ~~5,563,324~~, USPN. 6,372,961) is withdrawn herein in view of Applicants' arguments.

4. The following is the rejection maintained in the previous office action under 35 USC 103(a):

Claims 28-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersson et al. (Proc.Natl.Acad.Sci.USA., Vol. 93, pp: 5682-5687, 1996) and in view of Bailey et al. (WO 98/12913).

Anderson et al. teach a method for measuring the levels of nonsymbiotic plant hemoglobin in soybean plant tissue wherein Andersson et al. disclose that the method comprises measuring nonsymbiotic hemoglobin gene levels in shoots, roots, germinating seeds and of soybean plant (see page 5683, column2, paragraph 1). Andersson et al also disclose that (i) the nonsymbiotic hemoglobin levels were higher in root elongation (germination), cotyledons and stem (see page 5686, column 2, paragraph 2); (ii) function of nonsymbiotic hemoglobin as a facilitator of oxygen diffusion in dividing cells and as an oxygen sensor to meet increased demand (stress conditions) for oxidative respiration (see page 5686, column 2, paragraphs 1-2). However, Andersson et al. did not teach a method of improving the agronomic properties of a plant under stressful conditions.

Bailey et al. teach a method for improving the agronomic properties of a plant wherein Bailey et al. disclose that the method comprises transforming a plant and providing a regenerated plant with increasing intracellular oxygen-binding protein (for example hemoglobin, leghemoglobin etc.) (see page 4, lines 10-18, page 30, lines 10-15, claim 15). Bailey et al. also disclose that the improved agronomic properties include rapid germination, improved vegetative yield (seedling vigor) and high levels of secondary metabolites whose production is oxygen sensitive (fermentation products) (see page 6, lines 19-29). Further Bailey et al. disclose that (i) the generation of plants with improved agronomic characteristics include metabolically engineering an increased oxygen level or increased utilization (uptake) of oxygen (see page 4, lines 10-18); (ii) increased drought tolerance (hypoxic conditions) (see page 9, lines 19-22); (iii) the transformed plants and their progeny are selected or screened (to use in plant breeding) plants that express the desired protein or altered expression of the oxygen binding protein (hemoglobin) which has the agronomic characteristics by the procedures well known in the art (see page 11, lines 12-21, page 12, lines 15-33, page 13, lines 6-15).

Therefore, it would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made, to modify a method of using nonsymbiotic haemoglobin to increase cellular oxygen in plants as taught by Andersson et al. with a method of improving agronomic properties of plants as taught by Bailey et al. to achieve expected advantage of improving agronomic properties of plants because Andersson et al. states that "the high levels of nonsymbiotic hemoglobin is perhaps associated with high levels of metabolic activity. Nonsymbiotic hemoglobin genes are all expressed in various metabolically active tissues such as developing seeds and roots. It is possible that the nonsymbiotic hemoglobin is facilitating

intracellular diffusion of oxygen to mitochondria in metabolically active cells in order to meet an increased demand for oxidative respiration” (see page 5686, column 2, paragraph 2) One such demand for oxygen demand, expressly motivated by Bailey et al. is to use oxygen-binding properties in plants to improve agronomic properties of a plant. An ordinary practitioner would have been motivated to combine the method of Bailey et al. with the method of Sowa et al. in order to achieve the expected advantage of developing a rapid and sensitive method for improving agronomic properties of plants.

Response to arguments:

Applicants’ arguments and amendment are fully considered and found not persuasive.

Applicants’ particular argument that the instant invention shows that nonsymbiotic hemoglobin is not involved mitochondrial oxidation and does not facilitate diffusion of oxygen, is fully considered. However, as stated in MPEP 2145, “Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims”. In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993), the instant independent claims 28 and 35 do not recite this limitation and specification is not be read into the claims Further the Examiner notes that the instant claim 33 recites that the method of improving the agronomic properties include oxygen uptake, which clearly shows that the nonsymbiotic hemoglobin of the instant invention does facilitate diffusion of oxygen. Applicants further argue that the nonsymbiotic hemoglobins as taught by Bailey et al. and the instant invention differ significantly because these proteins have significantly different oxygen binding properties than those described by Bailey et al., which is fully considered and found not persuasive because it is not relevant to the instant context, where the instant claims do not recite any specific nonsymbiotic

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hemoglobin and no relation is shown to its binding properties to increase the cellular levels of the said protein. Examiner also recognizes the amended claims recite a limitation (i.e., thereby / for maintaining cell energy status in a low oxygen environment). However this recitation is an intended use and it would not alter the structural status of the claims because the instant claims do not recite any method step that achieves this goal, that is, how the said intended use is achieved (such as placing plant into low oxygen environment) which would recognize the necessity of the said limitation in the claim and would recognize that stress is "low oxygen environment".

Applicants' argue that there is no teaching or suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir.1992). In this case, specific motivation is provided by the teachings of Bailey et al. and Andersson et al. to improve agronomic properties with nonsymbiotic hemoglobins. An ordinary practitioner is motivated to develop a method to increase the intracellular levels of nonsymbiotic hemoglobins under hypoxic conditions since transforming plants with nonsymbiotic hemoglobin would improve the agronomic properties. Therefore, the rejection is maintained herein.

Conclusion

No claims are allowable.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suryaprabha Chunduru whose telephone number is 703-305-1004. The examiner can normally be reached on 8.30A.M. - 4.30P.M, Mon - Friday.


If attempts to reach the examiner are unsuccessful, the primary examiner in charge of the prosecution of this case, Jeffrey Fredman can be reached at 703-308-6568. If attempts to reach the examiners by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 703-308-1119. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-0294 for regular communications and - for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.


Suryaprabha Chunduru
June 19, 2003


JEFFREY FREDMAN
PRIMARY EXAMINER